

OR

- (B) (i) What are the basic assumption used in ANOVA ? Explain its importance in Bioassay.
- (ii) Explain the concept of Prior in connection with Bayes approach. Which Prior is used to estimate ED_{50} ?

8+8

**AQ - 1013**

Third Semester M. A. / M. Sc. (Part - II)
Examination

STATISTICS

Paper - XI (3 SCA 3)
(EI/II: 1) Bioassay

P. Pages : 4

Time : Three Hours]

[Max. Marks : 80

Note : Solve either A or B in each question.

1. (A) (a) State and Prove Fieller's Theorem.
- (b) Derive estimate of relative potency in direct assay and state its Fiellers limits.
- 10+6

OR

- (B) (i) Explain asymmetric parallel line assay and various test involved in it.
- (ii) Discuss components of Bioassay and define Potency and Relative Potency.
- 10+6

2. (A) (a) Explain the maximum likelihood method for the estimation of Parameters in Probit approach.

- (b) Explain the procedure of minimum logit χ^2 to estimate the parameter in dose response relationship. 10+6

OR

- (B) (i) Define the following terms :—

- (a) Tolerance.
- (b) Tolerance dose.
- (c) Quantal response.
- (d) Median effective dose.

- (ii) Define logit. Show that median effective dose is given by —

$$ED_{50} = e^M$$

$M = -\hat{a}/\hat{b}$, where $\hat{a}$ and $\hat{b}$ are the least square estimates. 8+8

3. (A) (a) Explain dose allocation scheme in Bioassay.
- (b) Describe allocation of doses by Muller Schmitt method using maximum likelihood estimate. 6+10

OR

- (B) (i) Discuss optimum sampling strategy.
- (ii) Describe Spearman Karber method to estimate median effective dose and derive its variance. 6+10

4. (A) (a) Explain Robbin – Monro method of sequential approximation.
- (b) Explain stopping rule and give its importance. 8+8

OR

- (B) (i) Describe Up and Down sequential approximation procedure suggested by Weitherill.
- (ii) Describe likelihood function under various experimental data. 8+8

5. (A) (a) Explain the Bayesian approach to the bioassay problem.
- (b) What is Dirichlet Prior ? State all its properties. 10+6